

KITCHEN SPACE PLANNING IN SMALL-SCALE HOUSES

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Abstract

This article discussed the desirability of small-scale houses and focused on kitchen space planning as critical to well-designed housing. People live in small-scale homes for a variety of reasons; some by necessity and some by choice. Designers and builders of small-scale housing need to offer different options in kitchen design to meet the variety of needs of residents of these households. Kitchens in small-scale housing should not necessarily be just a smaller version of a large kitchen in a large house. A well-designed small-scale house needs to recognize how Americans use, or do not use, their kitchens. Small-scale housing, perhaps more than larger housing, needs well-planned kitchen storage, including pantries, drawers, and interior cabinet storage devices. Recognizing how a kitchen is actually used for food preparation and beyond offers flexibility in designing small-scale housing adapted to different lifestyles. Successful kitchen space planning in small-scale houses is not achieved just by making the room smaller. It needs a rethinking of how residential spaces are conceived.

Introduction

Virtually all segments of the American home buyer market are buying the largest houses they can afford (Wilson & Boehland, 2005). Since 1950 the average size of new single-family houses in the U.S. has more than doubled, increasing by more than 1,247 square feet even as the average family size has steadily shrunk by one person. However, another trend indicates that home buyers today are

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becoming less interested in size and more interested in quality and good design (Susanka, 1998). It seems that some home buyers are willing to trade off bigger spaces for better planning (Heavens, 2005).

A well-planned space can be more valuable in small-scale housing than larger housing. Especially when a space is used as a multi-purpose space, more efficient and better planning is needed. Today's kitchen is one of the spaces representing a multi-use space in family life. Kitchen space is not just for cooking related work (Emmel, Beamish, & Parrott, 2005). Rather, this is also the place for eating, entertaining, watching television, working with a computer, using the telephone, and relaxing (Grey, 1996). One of the key findings from a recent worldwide Gallup survey on kitchen use commissioned by home furnishing retailer IKEA, is the strong connection between overall satisfaction with the kitchen and harmony in relationships with spouses and children. Respondents in countries with significantly high kitchen satisfaction also expressed greater overall family happiness. According to the survey the kitchen truly is the heart of a home. Nearly one fourth of worldwide respondents spent more time in the kitchen than any other place in the home with uses and activities expanding far beyond cooking (*Furniture World Magazine*, 2005).

As the kitchen becomes the center of household interaction this space, especially in smaller homes, needs a new design paradigm. There are many reasons and trends to explain why this is a major design direction, including changing habits for food preparation and consumption, varied lifestyles, pre-prepared foods, and sophisticated appliances. Thus, the purpose of this research is to investigate kitchen space planning as critical to well-designed small-scale housing.

Desirability of Small-Scale Houses

Demand or Desirability

A survey of Web site visitors by the National Association of Home Builders indicated that some people are willing to trade off home size for a shorter commute to work/shopping/entertainment. When asked the question "Given the choice of a \$150,000 townhouse in an urban setting or a \$150,000 detached house in an outlying area, bigger in size, but farther from work and shopping," 17% percent of respondents chose the smaller but more convenient home (Perkins, 1999).

There is a significant minority of American home buyers today that are becoming less interested in size and more interested in quality and good design. It seems that some home buyers are willing to trade off bigger spaces for better planning; for example, they prefer places with well-planned closets (Heavens, 2005). There is considerable evidence suggesting the desirability of providing small-scale housing in the U.S.

In terms of demographics, U.S. households are becoming more diverse as minority, single-person, single-parent, and female-headed households make up ever larger shares of successive generations (Joint Center for Housing Studies of Harvard University, 2006). The numbers of “nontraditional” households (unmarried couples, female householders, and singles of all types) are growing rapidly, especially among the native-born white population. These segments of the population traditionally prefer smaller homes as compared to traditional family households, often because the smaller homes are more affordable. Increasing portions of immigrants in the population, who usually have been considered small home buyers primarily because of affordability, also increase the demand for smaller housing.

Another population predicted to create a demand for small-scale homes is the increasing aging population. Baby boomers and empty nesters are searching for smaller but high-quality houses. Experts say the demand for smaller, one-story, nearly care-free homes is still exceeding the supply. This trend also reflects a desire for a maintenance-free life style (*The Indianapolis Star*, 2005).

For people who will be first-time homeowners, especially in specific areas, small-sized homes are more favorable options. In places such as the San Francisco Bay area and New York City, where middle-class, design-conscious people seem more interested than ever in becoming homeowners, the small condominium or cottage is often the only entrée into the market (Lloyd, 2005).

Most U.S. building codes are “mansionization friendly.” For example, Beverly Hills, California caps home size at 15,000 square feet, restrictive only for those who dream of adding the indoor football field. Los Angeles, California allows a 7,600 square foot multi-story home on a 5,000 square foot lot, with a Flora Area to Buildable Lot Area Ratio of 3:1 (Laws, 2005, PreserveLA Editor, 2006). However, in 2005 the Los Angeles City Council endorsed an ordinance that would limit the size of homes built in an area of the San Fernando Valley. Called “anti-mansionization,” the law would restrict homes built on 8,000 square foot lots to a maximum of 2,400 square feet or 40% of the lot size, whichever amount is greater (United Press International, 2005). The measure is an effort to combat so-called “McMansions” and involves characteristics of neighborhoods, quality of life, and privacy issues. This law seems to be favorable to some neighbors according to Laws (2005), with neighbors in California, Connecticut, Illinois, Pennsylvania, New Jersey, Maryland, and Massachusetts convening with local officials to discuss similar “anti-mansionization” laws.

However, reactions from the building and real estate community on this issue have been varied. One of the reactions from the real estate community is that the answers for balancing and retaining community character alongside the economic growth needed to continue to thrive are different in different areas (Wood, 2005). Another reaction is that some proposed “anti-mansionization” ordinances are too

restrictive. For example, a proposal to restrict the size of the second story compared with a home's first floor seems to be a restriction of architectural style and thus a restriction of tastes (Laws, 2005).

Sustainable Living

Another significant social and cultural trend is the growing attention to sustainable living. Sustainability is defined as achievement of balance and a plan for long term growth and nurturing (Parrott, 1997). Its philosophy is pursuing less consumptive lifestyles, global interdependence, environmental stewardship, social reliability, and economic viability. When this philosophy is applied to buildings these are called sustainable or "green" buildings. These buildings are designed, built, and occupied as more environmentally sensitive structures. Reduced building size or wise use of spaces is one major topic in the development of sustainable buildings. Therefore, the concept of sustainable living for single-family houses emphasizes that small is beautiful and desirable. In terms of environmental performance, larger houses consume more resources both in construction and during operation (Wilson & Boehland, 2005).

It is worthy to note Energy Efficient Mortgages (EEM) when discussing small-scale housing. EEMs provide borrowers with special benefits, such as a larger loan to value ratio, when purchasing a home that is energy efficient or can be made efficient through the installation of energy saving improvements. Smaller homes are advantageous when energy efficiency is the goal. EEMs encourage people to choose energy efficient homes when they are buying, selling, refinancing, or remodeling homes. EEMs are easy to use, federally recognized, and can be applied to most home mortgages (Pacific Gas and Electric Company, 1996).

Designing the Small House

Recent arguments for space efficient houses among designers and architects can be understood in the same context. A small house can be less expensive to build (buy), more energy efficient, and easier to maintain without sacrificing comfort or appearance. A small home can have a smart, flexible floor plan, good storage opportunities, well-positioned glass (windows and skylights) to open up the house, and clever extensions (balconies, patios, decks, and even rooftop living areas) with a variety of uses (Sell, 2006).

Sarah Susanka's influential work *The Not So Big House* (1998) recommended designing houses that emphasize quality over quantity. She argued not for a small house, but a smaller house on a human scale. She suggested that comfort comes from smaller scale spaces and attention to detail.

The South Mountain Company has been emphasizing space efficient housing since its launch nearly 30 years ago. In addition to providing open plan living/dining/kitchen areas, the company suggests providing built-in furnishings and storage spaces, eliminating single-use hallways, designing

multiple uses into rooms, and utilizing often wasted attic and low roof space (Wilson & Boehland, 2005).

A New Design Paradigm for Kitchen Spaces

In designing small-scale housing with an emphasis on space efficient plans, kitchen space planning might be the most important design decision as kitchens embrace more functions than ever before. Today's kitchen is evolving. Perhaps there is no more dramatic contrast in the evolution of the contemporary home than what has happened to the kitchen. Kitchens today are not what they used to be. Once a work area separate from the living area of the home, the kitchen is now the center of the home (Nielson, 2000).

Kitchen Space Activities

According to a Jenn-Air Homelife Trends Survey, nearly half (45%) of 750 respondents routinely used their kitchen for multiple activities including entertaining and relaxing (Grey, 1996). This outpaced cooking and eating only (33%) and cooking only (22%). The kitchen led the living room (29%) as the room where important activities took place and the most time was spent. This was especially true for those 50 years and older, but it was also a frequently used space by those who were 18-29 years old (Krafft, 1992).

A kitchen use survey conducted by IKEA revealed that nearly 60% of respondents cited the kitchen as one of the two most important rooms in the home. The survey was conducted through telephone and in-person interviews with 14,000 people in 28 countries, including the U.S. Respondents were asked about general kitchen use, habits, needs, and wants. Only 24% of respondents used the kitchen solely for the preparation of food, whereas 35% used the kitchen regularly for family discussion, 35% for socializing and entertaining, 16% for hobbies, and 15% for playing with children. The survey also found that as respondents grew older, the kitchen became increasingly more significant (*Furniture World Magazine*, 2005). Research conducted for the kitchen industry characterized the kitchen as "something very meaningful in the home.... Remodeling is less about things and more about feelings" (Fumo, 2006, p. 24).

Kitchen Space Planning Trends

As the kitchen becomes the center of household interaction, this space needs a new design paradigm. While the size of the kitchen is increasing, the cooking area itself is not. The extra space is for sociable uses so the pressure on the cooking zone remains as tight as ever and ergonomics remain more important than ever (Grey, 1996).

In post-war America the kitchen was designed as a functional laboratory for a single participant, the woman of the house. It was laid out with assembly line

efficiency with a window centered on the sink so she could watch the children in the back yard. However, as a result of a change in family lifestyles in recent years, it is not unusual for family members as well as friends and guests to share in food preparation, as the kitchen has become a social center. Today, according to the National Kitchen and Bath Association, 30-35% of all kitchens are being planned for more than one cook. The enthusiasm for two-cook kitchens steadily grows, and this trend seems desirable in terms of sharing kitchen duties in today's busy world (*Kitchen and Bath Design News*, 2006). Therefore, it becomes important to consider planning a kitchen for multiple cooks such as planning wider work stations or two separate work stations, more storage space, increasing walkway clearances, and varying counter heights (Garland, 2004).

Today's homeowners like "expandable-contractable designs" that locate auxiliary task areas out of the cook's main circulation area so that kitchens work well for one person or several. There is also strong demand for pantry storage, and homeowners are willing to steal space from other rooms such as laundry areas to get it. Aging Baby boomers are becoming more attuned to making kitchens user-friendly for now and the years ahead with lower counters, knee space under counters, and edging that demarcates counter borders (Jordan, 2006).

Description of Research

Findings from two national studies at Virginia Tech's Center for Real Life Kitchen Design can be applied to the design of kitchens in small-scale houses. The first study summarized findings from a comprehensive examination of American households to determine what activities are being carried out in today's kitchens (Emmel, Beamish, & Parrott, 2005). Data for this 2001 study were collected through a national telephone survey of 630 households and a personal interview and cooking activity with 78 local individuals. The second study in 2003 developed recommendations for storage requirements in kitchens being designed currently in North America (Parrott, Beamish, & Emmel, 2005). This study involved a national sample of 87 inventory surveys and personal interviews.

Results

Size of Homes (2001 and 2003 Studies)

The size of the home, not surprisingly, is a factor in the size of the kitchen. Table 1 shows that small kitchens are more likely to be in smaller homes, medium kitchens in mid-sized homes, and large kitchens in the largest homes.

The average number of household members in the 2001 data was 2.86 and 2.74 in the 2003 data. Table 2 shows that there is not a positive linear relationship between the size of homes and the size of households. However, the result from an ANOVA test indicated there was a household size difference in the 2001 data.

Table 1. Size of Kitchen by Size of Home (2003 Data)

Size of Home	Size of Kitchen			Total %
	Small <150 sq. ft. %	Medium 151 to 350 sq. ft. %	Large >350 sq. ft. %	
<2,000 sq. ft.	65	23	4	33
2,001 to 3,000 sq. ft.	29	67	46	47
>3,000 sq. ft.	7	10	50	20

Table 2. Mean of Household Size by Size of Home (2001 and 2003 Data)

Size of Home	Size of Household					
	2003 Data			2001 Data *		
	<i>M</i>	<i>N</i>	<i>SD</i>	<i>M</i>	<i>N</i>	<i>SD</i>
<2,000 sq. ft.	2.428	28	0.997	2.750 _a	320	1.278
2,001 to 3,000 sq. ft.	2.950	40	1.299	3.189 _b	116	1.376
>3,000 sq. ft.	2.777	18	1.003	2.789 _{a,b}	38	1.142
Total	2.744	86	1.159	2.860	474	1.302

* Means with different subscripts differ at $p < .05$, using Duncan's multiple comparisons

According to Duncan's multiple comparisons, the household size of small-scale homes and large-size homes is homogeneous and household size of middle-size homes and large-size homes are homogeneous as well. This result might be explained by different life cycles. Young couples without children might be more likely to live in small-scale homes, middle-aged couples with children to live in middle-size homes, whereas retired couples who can afford big houses live in bigger homes.

Location was not revealed as a significant factor on size of homes (Table 3). However, one of the noticeable findings is that bigger houses are less likely to be located in city areas (2003 data) and smaller homes are more likely to be located in a city (2001 data).

Storage Activities (2003 Study)

Large numbers of items are stored in the kitchen. As shown in Table 4, the number of different items as well as the total number of items increased as kitchen size increased. Households with small kitchens had fewer multiples and smaller size items. Large kitchen households had an average of 1,019 items whereas small kitchen households averaged 655 items. Although the increase is not strictly a linear relationship for the majority of items, the bigger sized kitchens had more items.

Table 3. Location by Size of Home (2001 and 2003 Data)

Size of Home	Location							
	2003 Data				2001 Data			
	Rural Area	Small Town	City Suburb	City	Rural Area	Small Town	City Suburb	City
<2,000 sq. ft.	6	7	8	7	79	72	69	97
2,001 to 3,000 sq. ft.	5	10	17	8	33	33	29	19
>3,000 sq. ft.	4	6	6	2	10	10	8	8
Total	15	23	31	17	122	115	106	124

Table 4. Summary Totals of Inventories by Size of Kitchen (2003 Data)

Category	Size of Kitchen		
	Small	Medium	Large
Small electric appliances			
Number of different items on inventory	14	16	16
Total number of items	15	18	18
Food preparation			
Number of different items on inventory	155	159	172
Total number of items	307	348	473
Serving			
Number of different items on inventory	64	73	76
Total number of items	218	296	352
Clean up			
Number of different items on inventory	26	29	28
Total number of items	60	65	75
Other			
Number of different items on inventory	33	37	38
Total number of items	55	93	101
Totals			
Number of different items on inventory	292	314	330
Total number of items	655	820	1,019

Notes:

1. Number is a summary of mean number for each item on the inventory
2. Items must be found in at least 25% of kitchens to be included in inventory

Almost all the kitchens had a microwave oven, refrigerator, and dishwasher. The side-by-side refrigerator was most popular. As kitchen size increased the likelihood that there was a separate cook top and built-in oven, as opposed to a range, increased.

The largest amount of storage is in wall and base cabinets. Tall or pantry cabinets are most likely to be used to store food and bulk products. As kitchen size increased more food storage was seen in tall or pantry cabinets, probably because this type of cabinetry was less likely to be found in a small kitchen. About one fourth of the small electric appliances were kept on the countertop. A countertop is usually considered work space in a kitchen. However, the results of this study suggest that countertops are also storage space. Smaller kitchen households keep more items on countertops, limiting workspace (Table 5).

Table 5. Countertop Storage by Size of Kitchen (2003 Data)

Category	Size of Kitchen		
	Small %	Medium %	Large %
Small electric appliances	24.0	25.0	17.0
Food preparation	41.0	28.0	23.0
Serving	17.0	10.0	7.0
Clean up	24.0	24.5	22.0
Other	43.0	37.0	31.0

Kitchen Activities (2001 Study)

In the 2001 national sample a surprising 72% of respondents said they prepared a meal five or more times a week. The most popular meal to prepare was dinner (67%), but about half the sample also prepared breakfast at least five times a week. Although the majority of households prepared meals frequently, the typical pattern was for one person to do most of the cooking. Almost one third of the participants reported multiple cooks, but only 13% actually reported cooking together.

The study showed that people were doing different things in the kitchen, including social activities, household management, relaxation, and recreation. It is worth noting that many of the most common activities typically were done while sitting, such as talking on the telephone (81%), conversation (76%), reading the newspaper (40%), and watching television (39%). In addition, many of these

activities typically required a desk, table, or similar work surface. Although there were a variety of non-cooking activities going on in the kitchen, many of these activities may be happening at the same time as cooking. Another activity that can take place in the kitchen is recycling. In the national sample 66% reported that they were regular recyclers.

Single households used their kitchens less frequently for food and non-food activities. Singles performed fewer food preparation activities and used more convenience and carryout foods, compared to other household sizes and types. They were less likely to eat in the kitchen. Non-single (two or more), couple, and family households had generally similar patterns of non-cooking kitchen activities. As might be expected, the larger (four or more) households tended to do some activities more frequently, reflecting more people in the home. Couple or two-person households tended to have food preparation activities more similar to larger and family households than singles. However, two person households (56%) and couple households (60%) were more likely to cook from scratch than other households. These same couple households were less likely to grill outdoors, use packaged convenience foods, or serve food buffet style than larger households.

Elderly households prepared foods from scratch more frequently and used more fresh produce compared to younger households. They also ate more meals and watched more television in the kitchen. One factor these differences may reflect is the increased availability of time in households with members who are likely retired. They were more likely to think an eating area is very important (67%). In addition, 82% of households with elderly members and family households who entertained frequently thought an eating area in the kitchen was very important.

It was reported that 67% of the households in the national survey ate in the kitchen. However, eating in the kitchen did vary by household size, household type, and cooking style. Generally, larger households, family households, and households with an elderly member ate in the kitchen more frequently than others.

Summary of Findings

In the two studies of kitchen design reported here, the size of the home was influenced by urban/non-urban location, with smaller homes tending to be in urban locations. Larger households tended to have larger homes. Not surprisingly, larger homes tended to have larger kitchens.

Several findings were of particular importance to the design of kitchens. The size of the kitchen was related to the quantity of items stored in the kitchen, with owners of larger kitchens having more things to store. Kitchen size also influenced the type and location of kitchen storage. Kitchen activities were not related to kitchen size but were influenced by the type, size, age, or lifestyle factors of the household.

Discussion and Conclusion

In terms of the size of homes, this research shows that the decision to have a certain sized house does not completely depend on household size or location. Although the influence of income, gender, or race was not determined in the two reported studies, it could be suggested that this decision is influenced by life cycles or lifestyles. Based on this result and assumption, small households and households with elderly members would be considered potential dwellers in small-scale houses.

Multiple people are in the kitchen even if they are not all participating in cooking activities. The microwave oven is a major cooking appliance and its placement needs careful consideration. Both cooking related activities and non-cooking related activities are influenced by household composition and lifestyles.

People live in small-scale homes for a variety of reasons; some by necessity and some by choice. Designers and builders of small-scale housing need to offer different options in kitchen design to meet the variety of needs of these resident households. Kitchens in small-scale housing should not necessarily be just a smaller version of a large kitchen in a large house. A well-designed small-scale house needs to recognize how Americans use their kitchens.

Specific recommendations and suggestions from the research conducted at the Center for Real Life Kitchen Design at Virginia Tech include the following.

- The proportion of floor space devoted to the kitchen in a small-scale house may be greater than in a large house. This recognizes the importance of the kitchen as a center for many household activities.
- The kitchen area in a small-scale house needs to be designed as a flexible space. It needs to accommodate many activities other than cooking and eating such as entertainment, household management, and hobbies. This suggests that the space may need to be more open to living, dining, or other spaces in the home. It also requires careful attention to technical details such as ventilation, lighting, material choices, utility connections, and sight lines so that the kitchen still functions effectively and safely as a cooking space.
- Storage is critical. Small-scale house kitchens may need to include pantry cabinets, cabinetry with interior storage features that increase efficiency, and overflow storage near/adjacent to the kitchen space. These are features often omitted from small houses due to economy, yet may actually increase efficient use of space and are thus desirable. Where possible it is important to consider what the household has to store in the kitchen and how to accommodate any special needs for storage and access to storage space.
- Adequate counter space is needed in the kitchen and may be comparable to what is needed in a larger home. Counter space may be used as a work area

for food preparation, to accommodate small appliances, and for storage or display space. Counter space in small kitchens is often cluttered if there is inadequate storage in the kitchen. Counter space may also be used for other household activities that require a horizontal work surface. Some counter space may need to be transition space between spaces/rooms.

- Full-size appliances may be desirable. This may be especially true of households that cook regular meals or entertain frequently. Small-scale appliances may be appropriate if shopping is done frequently or only one or two persons are eating (cooking) regularly. Many sizes are available today to meet specific spaces and needs.
- A seating area in or immediately adjacent to the kitchen is recommended. This can accommodate eating but will also likely be used for many other activities such as talking with the cook.
- Careful attention is needed to planning mechanical systems in the kitchen, especially lighting and ventilation. Flexibility in light levels for different uses of the space and control of cooking odors in open plan areas is important.
- Some small-scale houses may not need full, separate kitchens. Instead, flexible areas that could be used for simple “heat and serve” food preparation and eating as well as other household activities might be adequate. For instance, these areas might accommodate a microwave oven, cold food storage, water source, and limited cabinetry.

Is the work triangle still valid in planning today’s kitchens? It might be questioned due to the introduction of innovative kitchen appliances, different cooking patterns, and a variety of activities in kitchens. Yet many households, regardless of the size of their homes, still cook regular and frequent meals. Therefore, it is important to provide flexible lifestyle choices even in limited space. Evaluate the definition of a kitchen, matched to household composition and lifestyle. Some households need “complete” kitchens; some do not. Integrating the kitchen with living areas and considering multiple uses for food preparation and eating areas is important.

Recognizing how a kitchen is actually used for food preparation and beyond offers flexibility in designing small-scale housing adapted to different lifestyles. Successful kitchen space planning in small-scale houses is not achieved just by making the room smaller. It needs a rethinking of how residential spaces are conceived.

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